

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: §
Gopal B. Avinash et al. § Group Art Unit: 3737
§
Serial No.: 10/723,859 § Confirmation No.: 9691
§
Filed: November 26, 2003 § Examiner: Mehta, Parikha Solanki
§
For: METHOD AND SYSTEM TO § Atty. Docket: 139943-1/YOD/RAR/SIN
REDUCE MOTION RELATED
IMAGE ARTIFACTS DURING
BREATH HOLDING § (GEMS:0256)
§

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37 C.F.R. 1.8

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/John Rariden/

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REPLY BRIEF PURSUANT TO 37 C.F.R. §41.41

Appellants submit this Reply Brief pursuant to 37 C.F.R. §41.41, and in response to the Examiner's Answer mailed on April 29, 2008. Appellants, however, respectfully request that the Board consider Appellants' complete arguments set forth in the previously filed Appeal Brief, in addition to the following remarks.

Appellants have carefully reviewed the Examiner's arguments advanced in the Examiner's Answer. Appellants maintain that, contrary to the Examiner's assertions, the Riederer reference does not anticipate claims 1-8, 10-20, 22-32, and 35 under 35 U.S.C. §102(b). In addition, Appellants also maintain that, contrary to the Examiner's assertions, the Riederer reference does not render claims 9 and 21 obvious under 35 U.S.C. §103(a).

Definition and Interpretation of the Term “gating”

In the previously filed Appeal Brief, Appellants argued that the Examiner, contrary to legal precedent (e.g., the *Phillips v. AWH Corp.* case), had ignored or given little weight to the present specification. Instead, in spite of the apparent sufficiency of the claim language and of the discussion in the specification, the Examiner relied upon extrinsic evidence to justify an overly expansive interpretation of the term “gating” that is inconsistent not only with the teachings of the present specification, but with the plain language of the claims themselves. Specifically, the Examiner cited Merriam Webster’s dictionary definition of the term “gate” as “a device (as in a computer) that outputs a signal when specified input conditions are met *<logic gate>*.¹” Final Office Action, page 2 (emphasis in original). Appellants contend that this dictionary definition of the term “gate” is associated with electronics in general and bears only a tangential relation to the meaning understood by those skilled in the art in the specific field of imaging, as discussed in the specification. Indeed, it is unclear what basis the Examiner has in suggesting that one skilled in the art of medical imaging, after reviewing the present specification, would select this proposed definition of the term “gate” as appropriate or relevant.

In response to the previously filed Appeal Brief, the Examiner maintained this interpretation of the term “gating.” *See* Examiner’s Answer, page 5. In particular, the Examiner stated that:

The Examiner maintains that, although the claims have in fact been considered in light of the specification, it is the Examiner’s duty to rely upon their broadest reasonable interpretation when determining patentability of those claims in view of the prior art. Nowhere in the above-referenced passages of the pending disclosure does Appellant explicitly set forth a re-definition of the term “gating” from that which is commonly known in the art as meaning only initiation and termination of a process based upon motion data. It has previously been held that, where an applicant wishes to act as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that term (*Process Control*

Corp. v. HydReclaim Corp., 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 Fed. Cir. 1999). A mere discussion of specific examples of types of gating, as is presented in page 1 lines 23-26, page 4 lines 4-7, page 11 lines 11-15 of the present specification, does not constitute such a statement. Accordingly, it is reasonable and proper for Examiner to rely upon the definition set forth in a general purpose dictionary such as Merriam Webster, to determine the boundaries of the broadest reasonable interpretation of the term ‘gating’.

Id (emphasis added).

However, Appellants note that the Examiner actually supports the Appellants’ interpretation of the term “gating” by making the statement that it “is commonly known in the art as meaning only initiation and termination of a process based upon motion data.” Appellants point out that this is essentially the interpretation of the term “gating” that Appellants continue to espouse. Furthermore, if this particular interpretation of the term “gating” is “commonly known in the art” as the Examiner contended, then the Examiner’s reliance on the proposed dictionary definition is clearly improper, especially considering the inconsistencies between the two interpretations.

Furthermore, Appellants contend that the Examiner has placed far too much emphasis on the term “broadest” and far too little emphasis on the term “reasonable” in finding the “broadest reasonable interpretation” of the claims. Moreover, Appellants note that the Examiner must not merely find the broadest reasonable interpretation of the claims. Rather, the Examiner must give claims the broadest reasonable construction in light of the specification as it would be interpreted by one of ordinary skill in the art. See, e.g., *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364, 70 U.S.P.Q.2d 1827 (Fed. Cir. 2004); see also *In re Cortright*, 165 F.3d 1353, 1359, 49 U.S.P.Q.2d 1464, 1468 (Fed. Cir. 1999). Appellants contend that the Examiner’s extrinsic dictionary definition of the term “gating” is not reasonable in light of the specification as it would be interpreted by one of ordinary skill in the art in the field of imaging, as the Examiner’s own admissions appear to demonstrate.

For example, Appellants point to Figures 2 through 5 of the present application. All four of these figures make clear that gated image data is acquired by (1) acquiring respiratory motion data, (2) deriving attributes of motion data, (3) obtaining motion thresholds, and (4) acquiring/selecting the gated image data based upon the motion thresholds. *See, e.g.*, Application, FIGS. 2-5. Therefore, Appellants contend that one of ordinary skill in the art in the field of imaging would interpret the term “gated image data” in light of the specification as being determined based upon motion data (e.g., when motion slows to a certain level or speeds up to a certain level). Moreover, the terms “gating” and “gating intervals” should be similarly interpreted in this context. Therefore, Appellants again submit that relying on extrinsic dictionary evidence to define the term “gating” was improper since the extrinsic dictionary definition used by the Examiner is not reasonable in light of the specification as it would be interpreted by one of ordinary skill in the art in the field of imaging.

The Examiner also argued that Appellants, acting as their own lexicographer, had not clearly redefined a claim term so as to put one reasonably skilled in the art on notice that Appellants intended to redefine the claim term. *See* Examiner’s Answer, page 5. However, Appellants were not acting as their own lexicographer or redefining a claim term. Rather, in the previously filed Appeal Brief, Appellants merely pointed out that one skilled in the art would understand, in light of the specification and common usage, the terms “gating” and “gating intervals” without the need for Appellants to redefine the terms.

Furthermore, even if Appellants had been trying to act as their own lexicographers, the Examiner’s extrinsic dictionary evidence would still not be reasonable in light of the evidence in the specification, as discussed above. *See, e.g.*, Application, Figure 2-5. Indeed, Appellants again refer to the Examiner’s own statement that the term “gating” is “commonly known in the art as meaning only initiation and termination of a process based upon motion data.” *See* Examiner’s Answer, page 5. Therefore, the Examiner even appears to acknowledge that redefining the term “gating”

is unnecessary in order for one skilled in the art to interpret the term as Appellants contend is proper.

Termination of Imaging Based on Motion Attributes

In the previously filed Appeal Brief, Appellants argued that there is no termination threshold based on motion in the Riederer reference, and termination of data acquisition instead appears to be based upon a set time (which appears to correspond to the projected length of a breath-hold) elapsing. *See, e.g.*, Riederer, col. 2, lines 3-13; col. 5, lines 41-43. In response, the Examiner argued that the Riederer reference “does in fact terminate imaging at the initiation of diaphragm movement.” *See* Examiner’s Answer, page 6. In particular, the Examiner stated that:

While it is true that Riederer (‘844) acquires image data for a set time period, Examiner maintains that this set time period does not teach away, nor is it mutually exclusive from the step of terminating image data acquisition at a motion threshold as recited in the current claims. Riederer (‘844) states that the breath hold time (“set time period”) is determined by using a respiration monitor to observe the acceptable amount of breath hold time for that particular subject, and the reference also goes on to state that “the degree of chest inflation is monitored with NMR measurements of the superior-inferior (S/I) position of the patient’s diaphragm” (col. 5 lines 48-53). The length of the breath hold cycle is thus determined from motion data by Riederer (‘844), and since image data acquisition is disclosed to occur concurrently to such a breath hold (col. 5 lines 28-30), one of ordinary skill would recognize that, in the reference method, image acquisition terminates at the end of the breath hold (Fig. 3), and this breath hold end constitutes a threshold as claimed. It is inherent that, upon termination of a breath hold, a patient’s diaphragm begins to move in order to initiate normal respiration. Therefore, it can be said that Riederer (‘844) does in fact terminate imaging at the initiation of diaphragm movement as stated in the previous rejection.

Id.

Appellants take exception to the Examiner’s contention that “Riederer (‘844) states that the breath hold time (‘set time period’) is determined by using a respiration monitor to observe the acceptable amount of breath hold time for that particular subject.” This suggests that the “set time period” is determined for a particular subject based on

motion data for that subject. Appellants strongly contend that the Riederer reference simply discloses no such thing. Rather, the passage cited by the Examiner merely discloses that “an acceptable breath-hold” is detected. *See, e.g.*, Riederer, col. 5, lines 48-53. All this passage means is that the subject may be monitored such that it may be determined whether an adequate breath-hold has been attained by the subject. In other words, the subject is simply monitored to make sure that the subject has adequately inhaled such that the set time period of data acquisition may begin. This passage from the Riederer reference in no way suggests that the “length of the breath hold cycle” is determined from motion data, as the Examiner suggested. *See* Examiner’s Answer, page 6. Rather, in multiple passages, the Riederer reference suggests that data acquisition merely continues for a “reasonable time period (e.g. up to 20 seconds) before it terminates.” *See, e.g.*, Riederer, col. 2, lines 7-13; col. 5, lines 41-43. Therefore, Appellants submit that the Riederer reference does not disclose “terminat[ing] imaging at the initiation of diaphragm movement,” as suggested by the Examiner. *See* Examiner’s Answer, page 6.

Retrospective Selection of Gated Image Data

In the previously filed Appeal Brief, Appellants argued that the Riederer reference does not disclose that the set of gated image data is selected from a set of image data, i.e., that selection is retrospective based on already-acquired data. In particular, the Riederer reference appears to relate to the initiation of acquisition of image data based on diaphragm location, i.e. differential acquisition. *See, e.g.*, Riederer, col. 5, lines 26-41, 48-50; col. 6, lines 29-66. In response, the Examiner argued that the Riederer reference discloses “post-acquisition selection of breath-hold image data” and, thus, discloses retrospective gating of image data. *See* Examiner’s Answer, page 7. In particular, the Examiner stated that:

Riederer (‘844) discloses registration of movement data to image data (col. 2 lines 36-41). Such registration must inherently occur post-acquisition, as it is not possible to register two sets of data that have not yet been acquired. Examiner maintains that, by registering the image data to the diaphragm motion data, one is effectively identifying those portions

of the image data that respond to the time period of least diaphragm movement, which is disclosed by the reference to be the desirable and useful portion of the image data (col. 1 lines 31-50, col. 2 lines 1-6). Riederer ('844) uses this portion of image data acquired during minimal movement to calculate an average dataset that has improved signal-to-noise ratio (col. 2 lines 36-48). By such post-acquisition selection of breath-hold image data, Riederer ('844) does in fact retrospectively gate the data.

Id., pages 6-7.

Therefore, it appears the Examiner bases the argument primarily on the conclusory statement that registration of motion data to image data “must inherently occur post-acquisition, as it is not possible to register two sets of data that have not yet been acquired,” without any evidence to support the statement. Appellants contend that, unlike certain image registration procedures which may require image data to be registered after being acquired, there is no similar need for movement data and image data to be registered after the data have been acquired. Indeed, Appellants can find no passage within the Reiderer reference which suggests that motion data and image data must necessarily be registered post-acquisition. It is entirely possible that registration of motion data and image data may be done during acquisition of the data.

Determination of Whether Scan Parameters are Satisfied

In the previously filed Appeal Brief, Appellants argued that the Riederer reference does not disclose “determining if one or more scan parameters are satisfied.” In response, the Examiner argued that the Riederer reference does, in fact, disclose this element, stating that:

Riederer states that “a respiration monitor is required to detect an acceptable breath-hold and to generate the respiratory trigger pulse” (col. 5 lines 48-51). Examiner interprets the step of detecting an acceptable breath-hold to constitute “determining if one or more scan parameters are satisfied” as is currently recited by the instant claims; i.e., the acceptability of the breath-hold is a scan parameter.

Id., page 7.

Appellants contend that the acceptability of a breath-hold cannot reasonably be interpreted as a “scan parameter” (i.e., a parameter of a scan). For instance, the specification discusses various types of “scan parameters” which, when satisfied, may generate a notification. *See, e.g.*, Application, page 15, line 6 – page 16, line 15. These may include a designated number of slices imaged, a designated number of images acquired, or a designated duration (i.e., parameters of a scanning operation or procedure). *Id.* In each of these situations, the parameter is related to how scanning is progressing. Therefore, Appellants contend that detecting whether an acceptable breath-hold has occurred before scanning begins cannot reasonably be interpreted as a “scan parameter.”

Moreover, Appellants point out the contrasting claim language of dependent claims 11 and 12 of the present application. Dependent claim 11 recites that a notification may be generated “if the one or more scan parameters are not satisfied” while dependent claim 12 recites that a notification may be provided “indicating a breath hold status.” These separate dependent claims suggest that a “breath hold status” is entirely different than a “scan parameter” as used in the present claims.

Conclusion

Based upon the above points of clarification in conjunction with the arguments made in the Appeal Brief, Appellants believe that the claims are clearly allowable over the Riederer reference. The Examiner’s rejections, therefore, cannot stand.

Respectfully submitted,

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